

WHAT IS CLAIMED IS:

1. A composition of matter selected from:
- 5 a) a substantially pure or recombinant DIRS1 polypeptide comprising at least three distinct nonoverlapping segments of at least four amino acids identical to segments of SEQ ID NO: 2;
- 10 b) a substantially pure or recombinant DIRS1 polypeptide comprising at least two distinct nonoverlapping segments of at least five amino acids identical to segments of SEQ ID NO: 2;
- 15 c) a natural sequence DIRS1 comprising mature SEQ ID NO: 2;
- 15 d) a fusion polypeptide comprising DIRS1 sequence;
- 20 e) a substantially pure or recombinant DIRS2 polypeptide comprising at least three distinct nonoverlapping segments of at least ten amino acids identical to segments of SEQ ID NO: 4;
- 20 f) a substantially pure or recombinant DIRS2 polypeptide comprising at least two distinct nonoverlapping segments of at least eleven amino acids identical to segments of SEQ ID NO: 4;
- 25 g) a natural sequence DIRS2 comprising SEQ ID NO: 4; or
- 25 h) a fusion polypeptide comprising DIRS2 sequence.
2. The substantially pure or isolated antigenic:
- 30 A) DIRS1 polypeptide of Claim 1, wherein said distinct nonoverlapping segments of identity:
- 35 a) include one of at least eight amino acids;
- b) include one of at least four amino acids and a second of at least five amino acids;
- c) include at least three segments of at least four, five, and six amino acids, or
- 35 d) include one of at least twelve amino acids; or

B) DIRS2 polypeptide of Claim 1, wherein said distinct nonoverlapping segments of identity:

- a) include one of at least thirteen amino acids;
- b) include one of at least eleven amino acids and a second of at least thirteen amino acids;
- c) include at least three segments of at least ten, eleven, and twelve amino acids; or
- d) include one of at least twenty-five amino acids.

3. The composition of matter of Claim 1, wherein said:

a) DIRS1 polypeptide:

- i) comprises a mature sequence of Table 1;
- ii) is an unglycosylated form of DIRS1;
- iii) is from a primate, such as a human;
- iv) comprises at least seventeen amino acids of SEQ ID NO: 2;
- v) exhibits at least four nonoverlapping segments of at least seven amino acids of SEQ ID NO: 2;
- vi) is a natural allelic variant of DIRS1;
- vii) has a length at least about 30 amino acids;
- viii) exhibits at least two non-overlapping epitopes which are specific for a primate DIRS1;
- ix) is glycosylated;
- x) has a molecular weight of at least 30 kD with natural glycosylation;
- xi) is a synthetic polypeptide;
- xii) is attached to a solid substrate;
- xiii) is conjugated to another chemical moiety;
- xiv) is a 5-fold or less substitution from natural sequence; or
- xv) is a deletion or insertion variant from a natural sequence; or

b) DIRS2 polypeptide:

- i) comprises a mature sequence of Table 2;

- ii) is an unglycosylated form of DIRS2;  
iii) is from a primate, such as a human;  
iv) comprises at thirty-five amino acids of SEQ ID NO: 4;  
5 v) exhibits at least four nonoverlapping segments of at least twelve amino acids of SEQ ID NO: 4;  
vi) is a natural allelic variant of DIRS2;  
vii) has a length at least about 30 amino acids;  
10 viii) exhibits at least two non-overlapping epitopes which are specific for a primate DIRS2;  
ix) is glycosylated;  
x) has a molecular weight of at least 30 kD with  
15 natural glycosylation;  
xi) is a synthetic polypeptide;  
xii) is attached to a solid substrate;  
xiii) is conjugated to another chemical moiety;  
xiv) is a 5-fold or less substitution from  
20 natural sequence; or  
xv) is a deletion or insertion variant from a natural sequence.

4. A composition comprising:

- 25 a) a substantially pure DIRS1 and another Interferon Receptor family member;  
b) a substantially pure DIRS2 and another Interferon Receptor family member;  
c) a sterile DIRS1 polypeptide of Claim 1;  
30 d) a sterile DIRS2 polypeptide of Claim 1;  
e) said DIRS1 polypeptide of Claim 1 and a carrier, wherein said carrier is:  
i) an aqueous compound, including water, saline, and/or buffer; and/or  
35 ii) formulated for oral, rectal, nasal, topical, or parenteral administration; or

- f) said DIRS2 polypeptide of Claim 1 and a carrier, wherein said carrier is:
- i) an aqueous compound, including water, saline, and/or buffer; and/or
  - ii) formulated for oral, rectal, nasal, topical, or parenteral administration.
5. The fusion polypeptide of Claim 1, comprising:
- a) mature protein sequence of Table 1;
  - b) mature protein sequence of Table 2;
  - c) a detection or purification tag, including a FLAG, His6, or Ig sequence; or
  - d) sequence of another interferon receptor protein.
6. A kit comprising a polypeptide of Claim 1, and:
- a) a compartment comprising said protein or polypeptide; or
  - b) instructions for use or disposal of reagents in said kit.
7. A binding compound comprising an antigen binding site from an antibody, which specifically binds to a natural:
- A) DIRS1 polypeptide of Claim 1, wherein:
- a) said binding compound is in a container;
  - b) said DIRS1 polypeptide is from a human;
  - c) said binding compound is an Fv, Fab, or Fab2 fragment;
  - d) said binding compound is conjugated to another chemical moiety; or
  - e) said antibody:
    - i) is raised against a peptide sequence of a mature polypeptide of Table 1;
    - ii) is raised against a mature DIRS1;
    - iii) is raised to a purified human DIRS1;
    - iv) is immunoselected;
    - v) is a polyclonal antibody;

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- vi) binds to a denatured DIRS1;  
vii) exhibits a  $K_d$  to antigen of at least 30  $\mu M$ ;  
viii) is attached to a solid substrate,  
including a bead or plastic membrane;  
ix) is in a sterile composition; or  
x) is detectably labeled, including a  
radioactive or fluorescent label; or
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- B) DIRS2 polypeptide of Claim 1, wherein:
- a) said binding compound is in a container;  
b) said DIRS2 protein is from a human;  
c) said binding compound is an Fv, Fab, or Fab2  
fragment;  
d) said binding compound is conjugated to another  
chemical moiety; or  
e) said antibody:
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- i) is raised against a peptide sequence of a  
mature polypeptide of Table 2;  
ii) is raised against a mature DIRS2;  
iii) is raised to a purified human DIRS2;  
iv) is immunoselected;  
v) is a polyclonal antibody;  
vi) binds to a denatured DIRS2;  
vii) exhibits a  $K_d$  to antigen of at least 30  $\mu M$ ;  
viii) is attached to a solid substrate,  
including a bead or plastic membrane;  
ix) is in a sterile composition; or  
x) is detectably labeled, including a  
radioactive or fluorescent label.
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- 30 8. A kit comprising said binding compound of Claim  
7, and:
- a) a compartment comprising said binding compound; or  
b) instructions for use or disposal of reagents in  
said kit.
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9. A method of producing an antigen:antibody complex, comprising contacting under appropriate conditions:

- a) a primate DIRS1 polypeptide with an antibody of Claim 7A; or
- b) a primate DIRS2 polypeptide with an antibody of Claim 7B;

thereby allowing said complex to form.

10. The method of Claim 9, wherein:

- a) said complex is purified from other interferon receptors;
- b) said complex is purified from other antibody;
- c) said contacting is with a sample comprising an interferon;
- d) said contacting allows quantitative detection of said antigen;
- e) said contacting is with a sample comprising said antibody; or
- f) said contacting allows quantitative detection of said antibody.

11. A composition comprising:

- a) a sterile binding compound of Claim 7; or
- b) said binding compound of Claim 7 and a carrier, wherein said carrier is:
  - i) an aqueous compound, including water, saline, and/or buffer; and/or
  - ii) formulated for oral, rectal, nasal, topical, or parenteral administration.

12. An isolated or recombinant nucleic acid encoding said:

A) DIRS1 polypeptide of Claim 1, wherein said:

- a) DIRS1 is from a human; or
- b) said nucleic acid:

- i) encodes an antigenic peptide sequence of Table 1;
- ii) encodes a plurality of antigenic peptide sequences of Table 1;
- iii) exhibits identity over at least thirteen nucleotides to a natural cDNA encoding said segment;
- iv) is an expression vector;
- v) further comprises an origin of replication;
- vi) is from a natural source;
- vii) comprises a detectable label;
- viii) comprises synthetic nucleotide sequence;
- ix) is less than 6 kb, preferably less than 3 kb;
- x) is from a primate;
- xi) comprises a natural full length coding sequence;
- xii) is a hybridization probe for a gene encoding said DIRS1; or
- xiii) is a PCR primer, PCR product, or mutagenesis primer; or

B) DIRS2 polypeptide of Claim 1, wherein said:

- a) DIRS2 is from a human; or  
b) said nucleic acid:

- i) encodes an antigenic peptide sequence of Table 2;
- ii) encodes a plurality of antigenic peptide sequences of Table 2;
- iii) exhibits identity over at least 30 nucleotides to a natural cDNA encoding said segment;
- iv) is an expression vector;
- v) further comprises an origin of replication;
- vi) is from a natural source;
- vii) comprises a detectable label;
- viii) comprises synthetic nucleotide sequence;

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ix) ~~is less than 6 kb, preferably less than 3 kb;~~

x) is from a primate;

xi) ~~comprises a natural full length coding sequence;~~

xii) is a hybridization probe for a gene encoding said DIRS2; or

xiii) is a PCR primer, PCR product, or mutagenesis primer.

13. A cell or tissue comprising said recombinant nucleic acid of Claim 12.

14. The cell of Claim 13, wherein said cell is:

a) a prokaryotic cell;

b) a eukaryotic cell;

c) a bacterial cell;

d) a yeast cell;

e) an insect cell;

f) a mammalian cell;

g) a mouse cell;

h) a primate cell; or

i) a human cell.

15. A kit comprising said nucleic acid of Claim 12,  
and:

a) a compartment comprising said nucleic acid;

b) a compartment further comprising a primate DIRS1 polypeptide;

c) a compartment further comprising a primate DIRS2 polypeptide; or

d) instructions for use or disposal of reagents in said kit.

35 16. A nucleic ~~acid~~ which:



- 5 a) hybridizes under wash conditions of 30 minutes at 30° C and less than 2M salt to the coding portion of SEQ ID NO: 1;
- b) hybridizes under wash conditions of 30 minutes at 30° C and less than 2M salt to the coding portion of SEQ ID NO: 3;
- 10 c) exhibits identity over a stretch of at least about 30 nucleotides to a primate DIRS1; or
- d) exhibits identity over a stretch of at least about 30 nucleotides to a primate DIRS2.
17. The nucleic acid of Claim 16, wherein:
- 15 a) said wash conditions are at 45° C and/or 500 mM salt; or
- b) said stretch is at least 55 nucleotides.
18. The nucleic acid of Claim 16, wherein:
- 20 a) said wash conditions are at 55° C and/or 150 mM salt; or
- b) said stretch is at least 75 nucleotides.
19. A method of modulating physiology or development of a cell or tissue culture cells comprising contacting said cell with an agonist or antagonist of a mammalian
- 25 DIRS1 or DIRS2.
20. The method of Claim 19, wherein said cell is transformed with a nucleic acid encoding a DIRS1 or DIRS2 and another cytokine receptor subunit.

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